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24514 THE AGRICULTURAL ECONOMY OF THE

KALAMAZOO-BLACK-MACATAWA-PAW PAW RIVERS BASIN

By

LINDA ZYGADLO,

JOHN SUTTON

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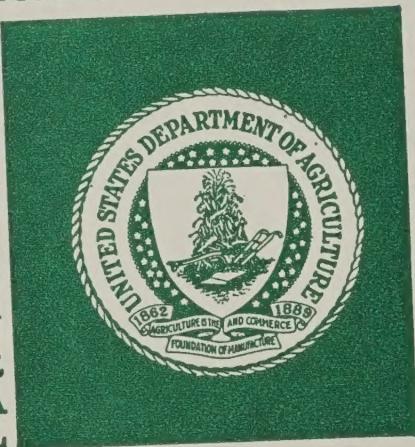
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THE AGRICULTURAL ECONOMY OF THE KALAMAZOO-  
BLACK-MACATAWA-PAW PAW RIVERS BASIN

by

Linda Zygadlo and John Sutton<sup>1/</sup>

INTRODUCTION

The U.S. Department of Agriculture is participating in a water and related land resource study of the Kalamazoo-Black-Macatawa-Paw Paw Rivers Basin with the State of Michigan. Specifically, cooperation will be accomplished through the Water Development Services Division of the Michigan Bureau of Water Management. A partial fulfillment of the responsibility assigned to the Economic Research Service includes an economic base study of the area. This base study analyzes current basic structure of the area's economy and includes projections of population, employment, income, and agricultural production.

The data presented in this report are intended to provide cooperating agencies with information on recent economic activity only. Attention is given to trends in population, employment in major economic sectors, and major land uses. Since the focus of the study is toward the agricultural activity in rural areas, particular emphasis is placed on socioeconomic aspects of the rural population, farm characteristics, and agricultural production.

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#### LOCATION AND DESCRIPTION OF THE BASIN

The Study Area is located in southwestern Michigan and contains about 3,050 square miles or 1,954,000 acres. This involves significant portions of 10 counties: Allegan, Barry, Berrien, Calhoun, Eaton, Hillsdale, Jackson, Kalamazoo, Ottawa, and Van Buren. (See Map ) The area is about 100 miles long and 50 miles wide at the widest point. The largest drainage basin is that of the Kalamazoo, with some 2,060 square miles. Topography varies from nearly level at the eastern extremity to rolling hills in the west. Soils are varied and complex ranging from very heavy to sands and gravels with some depressional areas of organic soils. The basin is located in a land resource area, entitled the Lake States fruit, truck crops, and dairy area.

Economic analysis would most easily be undertaken along county boundaries since most economic data is presented in this way. Since the limits of the river basin do not adhere to political boundaries, four subareas defined along political - hydrologic lines have been chosen for economic analysis. Their location and size are based on several factors. First, most economic data is available only at the county level. Second, statistical reliability of the soils data from the Conservation Needs Inventory requires an area larger than the hydrologic sub-basins used by SCS for watershed evaluation in other sections of the report. The economic subareas, the counties in them, and their major land uses in 1973 are presented below. The 1967 Conservation Needs Inventory was the basic acre measurement source for the subareas; it was supplemented with SCS estimates for subareas II and III.







Total Land Inventory, by County, Economic Subarea,  
and Major Land Use, 1967, Kalamazoo River Basin.

Subarea/County	Cropland	Pasture	Forest	Other Land	Fed., Urban, Agri.	Small Water	Total Land
I - Subtotal	294,488	19,136	85,827	25,183	99,085		523,719
Calhoun	178,538	12,439	50,106	15,602	51,672		308,357
Eaton	44,333	0	12,254	3,031	21,543		81,161
Hillsdale	27,410	1,704	11,205	1,549	2,730		44,600
Jackson	44,207	4,993	12,262	5,001	23,138		89,601
II - Subtotal	344,143	36,975	168,465	41,675	103,982		695,240
Allegan	205,275	25,901	104,882	17,218	29,968		383,244
Barry	44,954	6,989	31,943	7,521	9,928		101,335
Kalamazoo	93,914	4,085	31,640	16,936	64,086		210,661
III - Subtotal	170,347	18,843	67,234	12,587	20,220		289,233
Berrien	44,352	1,735	12,895	3,115	10,036		72,133
VanBuren	125,995	17,108	54,339	9,474	10,184		217,100
IV - Subtotal	200,477	13,157	105,616	12,760	18,708		350,718
Allegan	94,961	2,124	42,269	4,888	3,074		147,316
Ottawa	43,973	7,683	33,622	2,847	6,938		95,063
VanBuren	61,543	3,350	29,725	5,025	8,696		108,339
Basin: I-IV	1,009,455	88,111	427,142	92,205	241,995		1,858,908
V - Subtotal	1,240,284	116,336	443,523	171,778	187,091		2,159,012
10-County Total: I-V	2,249,739	204,447	870,665	263,983	429,086		4,017,920



## POPULATION

The Kalamazoo River Basin had a 1970 population of 556,378, a 10.0 percent increase over that of 1960 and 37.9 percent increase over the 1950 population of 403,450. Over the 20-year period, 1950-1970, the Basin population has grown slightly slower than that of the State of Michigan; while the former rose 37.9 percent the latter grew 39.3 percent.<sup>1/</sup>

Major urban centers<sup>2/</sup> include Battle Creek, which experienced a 12 percent decline between 1960 and 1970; the Kalamazoo Metropolitan area, an area of rapid expansion; Benton Harbor, where a decline of nearly 14 percent occurred in the 1960-1970 decade; and the City of Holland, which has reached a relatively stable population level.

The Basin is urbanizing at a greater rate than Michigan, even though Benton Harbor and Battle Creek lost significant numbers between 1960 and 1970. While the State's urban population increased by 45.5 percent between 1950 and 1970, the Basin experienced a 55.9 percent expansion of urban residents. Although there has been a shift from rural to urban areas between 1950 and 1970, the Basin is still characterized by a large rural populace. The 1970 Census identified 44.0 percent of the Basin population as rural in comparison to 26.2 percent for the State.

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1/ See Tables 1 and 2 for detailed population data.

2/ An incorporated city unit or group of units with a 1970 population greater than 10,000 persons.



Table 1. Population Data, 1950, 1960, 1970. Kalamazoo River Basin Study

		Total Population		Population Change	
	1970	: 1960	: 1950	: 1950-1970	: 1960-1970 : 1950-1960
----- percent -----					
Hydrologic Basin <u>1/</u>	556,378	506,019	403,450	37.9	10.0
Subarea I	158,959	152,399	131,592	20.8	4.3
Subarea II	234,218	202,503	154,092	52.0	15.7
Subarea III	74,575	73,718	57,105	30.6	1.2
Subarea IV	88,626	77,399	60,661	46.1	14.5
10-County Region	1,045,820	911,436	729,697	43.5	14.7
Michigan	8,875,083	7,823,194	6,371,766	39.3	13.4
					22.8

1/ Parts of Allegan, Barry, Berrien, Calhoun, Eaton, Hillsdale, Jackson, Kalamazoo, Ottawa, and VanBuren counties.

Source: U.S. Census of Population 1950, 1960, 1970.



Table 2. Urban Population, 1950, 1960, 1970. Kalamazoo River Basin Study.

	Urban 1/ Population	1970 :	1960 :	1950 :	1950-1970 : 1960-1970:	1960 :	1970 :	1960 :	1950 :	Urban Portion of Total
-----percent-----										
Hydrologic Basin	311,645	254,206	199,960	55.9	22.6	27.1	56.0	50.2	49.6	
Subarea I	92,820	97,760	88,787	4.5	-5.1	10.1	58.4	64.1	67.5	
Subarea II	147,923	97,698	69,262	113.6	51.4	41.0	63.2	48.2	45.0	
Subarea III	30,646	21,797	17,349	76.6	40.6	25.6	41.1	29.6	30.4	
Subarea IV	40,256	36,951	24,562	63.9	8.9	50.4	45.4	47.7	40.5	
10-County Region	523,535	462,420	361,928	44.6	13.2	27.8	50.1	50.7	49.6	
Michigan	6,553,773	5,739,132	4,503,084	45.5	14.2	27.4	73.8	73.4	70.7	

1/ The urban population consists of all persons living in places of 2,500 inhabitants or more incorporated as cities or villages, and incorporated places of 2,500 inhabitants or more.

Source: U.S. Census of Population 1950, 1960, 1970.



Subarea Comparisons.<sup>1/</sup>

The 1970 population of Subarea 1<sup>2/</sup> stood at 158,959 - a 20.8 percent increase over the 1950 level of 131,592. This was the smallest growth of the four subareas. While Subarea I had the largest percentage of urban population in 1950, 67.5 percent, this percentage has steadily decreased and by 1970 was only 58.4 percent. Between 1960 and 1970, the number of urban residents diminished 5.1 percent. The bulk of the loss was in Battle Creek where the number of inhabitants dropped 11.9 percent over the same period. Battle Creek's 1960 population of 44,169 comprised 29.0 percent of the subarea total; by 1970, it had fallen to 38,931 persons.

Subarea II is the most urbanized and rapidly growing subarea in the basin. Its population expanded from 154,092 to 234,218, a 52.0 percent increase between 1950 and 1970; at the same time, urban population rose 113.6 percent. All of the urban growth occurred in the Kalamazoo metropolitan area, a region encompassing Kalamazoo, Portage, and many unincorporated urban areas. In 1970, this metropolitan area had an urban population of 146,686, representing 62.6 percent of the Subarea's population. While urbanizing, the total number of rural residents has decreased, between 1960 and 1970 the rural population declined 17.7 percent. Although Subarea II is the most populous of the subareas, it has the lowest population density, an average of only 3.0 persons per acre.

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1/ See Figure 1 for geographical delineations of the subareas and the location of the Kalamazoo River Basin in Michigan.

2/ See Table 3 for the counties and portions of counties included in each Subarea.



KALAHAZO BLACK-MACATAWA-PAW PAW RIVERS BASIN  
Michigan

MICHAEL

LEGEND

Rivers, streams, creeks

Roads

Land features

Towns

1908 San Joaquin River flood

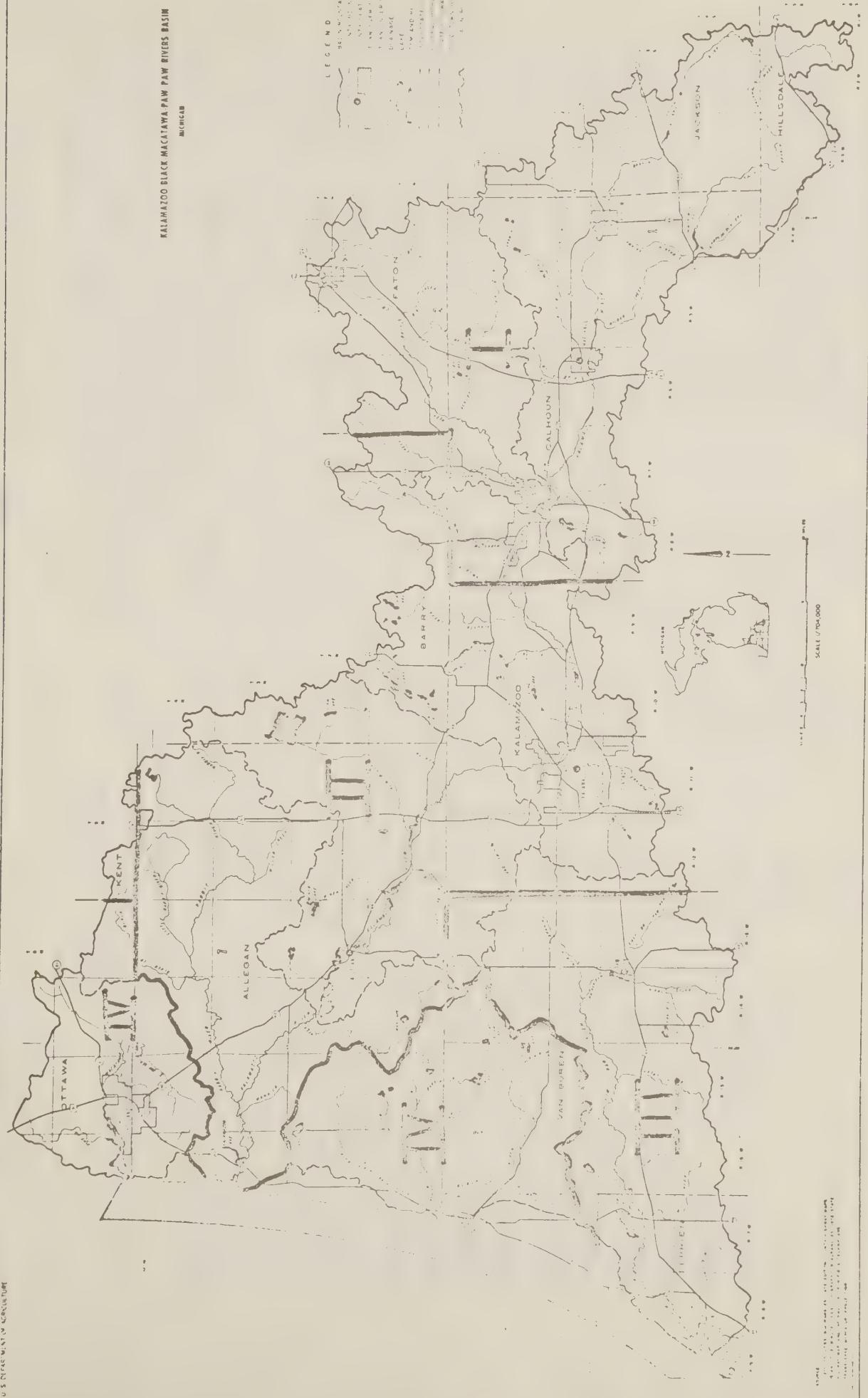




Table 3. Total Population and Urban Population by Subarea and County Divisions, 1950, 1960, 1970.  
Kalamazoo River Basin Study.

	Total Population			Urban Population <sup>1/</sup>		
	1970	1960	1950	1970	1960	1950
----- numbers -----						
Subarea I	158,959	152,399	131,592	92,820	97,760	88,787
Hillsdale	1,570	1,480	1,289	-	-	-
Jackson	8,708	7,046	5,168	-	-	-
Calhoun	131,547	129,046	112,625	84,576	90,103	82,181
Eaton	17,134	14,827	12,510	8,244	7,657	6,606
Subarea II	234,218	202,503	154,092	147,923	97,698	69,262
Barry	10,313	7,899	5,686	-	-	-
Kalamazoo	177,190	150,790	113,280	136,255	85,609	57,704
Allegan	46,715	43,814	35,126	11,668	12,089	11,558
Subarea III	74,575	73,718	57,105	30,646	21,797	17,349
VanBuren	29,184	27,157	19,445	5,668	2,970	2,382
Berrien	45,391	46,561	37,660	25,978	18,827	14,967
Subarea IV	88,626	77,399	60,661	40,256	36,951	24,562
Allegan	19,388	16,247	12,087	3,346	2,637	-
VanBuren	19,486	18,662	15,336	6,471	6,149	5,629
Ottawa	49,752	42,490	33,238	30,439	28,165	18,933
Basin Totals	556,378	506,019	403,450	311,645	254,206	199,960

<sup>1/</sup>Urban population will be defined as: the total number of persons residing in village units, or incorporated cities with populations  $\geq 2,500$ ; and persons residing in unincorporated urban areas with populations  $\geq 5,000$ .

Source: U.S. Census of Population, 1950, 1960, 1970.



Subarea III's 1970 population of 74,575 was the lowest of the four subareas. Although population expanded 30.6 percent between 1950 and 1970, it grew only 1.2 percent between 1960 and 1970. This low rate of growth can be largely attributed to the 13.9 percent decline experienced by Benton Harbor during the same period. Total urban population increased from 17,349 in 1950 to 30,646 or 41.1 percent of the subarea population in 1970.

The 1970 population of Subarea IV, 88,626, represented a 46.1 percent increase over the 1950 level. While numbers expanded 27.6 percent between 1950 and 1960, growth slowed to 14.5 percent in the following decade. Between 1950 and 1970, urban population increased 63.9 percent; 45.4 percent of the 1970 population were urban residents. Urban numbers appear to be stabilizing; between 1960 and 1970 urban expansion was only 8.9 percent, and Holland, the major urban area with a 1970 population of 26,337, grew but 6.3 percent. The density of Subarea IV, 4.0 persons per acre, is the highest in the basin.

#### Demographic Characteristics.

Net migration was not available for either the subareas or for the basin. However, data for the entire 10-county area indicates that Calhoun county had the greatest percentage of out-migration between 1960 and 1970. It can be expected that this is largely attributed to the declining Battle Creek area. Kalamazoo county had the highest net migration rate between 1950 and 1960 when it was rapidly urbanizing. In the following decade, however, Eaton county experienced the greatest net migration. Only 22 percent of that county is included in the hydrologic basin. Much of the net migration in Eaton County resulted



from the westward expansion of Lansing and its suburbs, areas not in the basin.

The educational level in the 10-county area for persons 25 years or older in 1970 ranged from a median grade completed of 11.5 in Allegan County to 12.3 in Eaton and Kalamazoo Counties. This compares to 12.1 years for Michigan. Each of the ten counties' median grade completed was 12.0 or greater except Van Buren (11.6) and Allegan (11.5) counties.

The percentage of individuals 25 or over who had completed four years of college ranged from a low of 5.4 in Allegan County to a high of 14.5 in Kalamazoo County (Western Michigan University is located in the city of Kalamazoo). Berrien (9.4 percent), Eaton (9.4 percent), and Kalamazoo (14.5 percent) were the only counties that matched or bettered the percentage of college graduates in the state of Michigan (9.4 percent).

#### Major Urban Areas.

The economic health of the urban areas is reflected in that of the entire basin. Urban areas within and adjacent to the basin provide employment and educational opportunities for its urban and rural populace. The two major urban areas in the Kalamazoo River Basin are Battle Creek and the Kalamazoo Metropolitan area. Urban areas outside the hydrologic basin but close enough to have a substantial influence on its economy include Grand Rapids, Jackson, and Lansing.<sup>1/</sup>

---

1/ See Figure 2.



The city of Kalamazoo, located in Subarea II, had a 1970 population of 85,661, a 4.2 percent increase over the 1960 level. The metropolitan area which includes Portage had an urban population of over 150,000, a 29.7 percent increase over the 1960 figure. Median income for city households in 1970 was \$9,849. Battle Creek, located in Subarea I, had a 1970 population of 38,931, an 11.9 percent decline over the 1960 level. The median income for Battle Creek households was \$9,652. Grand Rapids with an urban metropolitan population of over 400,000 is located in Kent County immediately north of the basin. Lansing is located in Ingham County, northeast of Subarea I; its metropolitan population is over 260,000. The Jackson metropolitan area, located east of Subarea I, had an urban population of nearly 79,000 in 1970.



## ECONOMIC INDICATORS

### Labor Force.

Labor force employment provides one of the best indicators of an area's current and potential economic growth. When a large percentage of the labor force is employed, output is near capacity. High employment also indicates, not only a desire for goods and services, but also the ability to obtain them.

Labor force data is only available on a county-basis. Civilian employment for the 10-county area rose 19.6 percent from a 1960 level of 330,365 to a 1970 total of 395,117. The largest gains were experienced in Eaton County (45.3 percent) and Ottawa County (37.3 percent). Calhoun County had the lowest employment gain--6.8 percent--but it also had an out-migration of 9.5 percent.

In 1970, 5.2 percent of the civilian labor force was <sup>un</sup>employed--this compares to a Michigan unemployment rate of 5.9 percent. State-wide unemployment declined from 6.9 to 5.9 percent between 1960 and 1970; on the other hand, the 10-county level rose from 4.8 to 5.2 percent. In 1970, Hillsdale County had the highest unemployment rate, 6.4 percent--Eaton County the lowest, 3.9 percent.

Labor force data is presented for six sectors of the economy in Table 4. The number of workers increased in all sectors except agriculture where employment dropped 38.0 percent between 1960 and 1970, a decline nearly identical to that for the State. The decline was greatest in Subregion I.<sup>1/</sup> In terms of persons employed, the sector

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<sup>1/</sup> With the exception of population figures, socio-economic data are only available for whole counties. The subarea level of analysis which includes parts of counties as well as whole counties cannot be used. Subregion I is Calhoun, Eaton, Hillsdale, and Jackson Counties. Subregion II is Allegan, Barry, Berrien, Kalamazoo, Ottawa, and VanBuren Counties.



Table 4. Numbers Employed by Sector, 1960, 1970. Kalamazoo River Basin Study.

Sectors	1970	1960	% change	Subregion I	Subregion II	10-County Region	Michigan
<b>Agriculture, forestry, fisheries</b>	4,043	7,176	-43.7	9,512	14,699	21,875	58,707
				14,699	-35.3	-38.0	93,662
				96,189	80,955	125,774	-37.3
<b>Manufacturing</b>	52,652	44,819	17.5	18.8	18.3	148,841	1,168,540
						125,774	1,035,892
						18.3	12.8
<b>Transport., Communication, Utilities</b>	8,457	8,479	-0.3	10,511	9,109	18,968	170,308
				9,109	15.4	17,588	155,588
						7.8	9.5
<b>Wholesale, Retail Trade</b>	27,388	21,976	24.6	45,455	33,496	72,843	632,596
				33,496	35.7	55,472	484,018
						31.3	30.7
<b>Services</b>	47,320	39,309	20.4	72,119	52,693	119,439	1,053,162
				52,693	36.9	92,002	830,363
						29.8	26.8
<b>Mining and Construction</b>	7,681	6,242	23.1	13,790	11,412	21,471	169,517
				11,412	20.8	17,654	140,902
						21.6	20.3

Source: U.S. Census of Population, 1960, 1970.



Table 5. Percentage Distribution of Employment by Sector, 1960, 1970. Kalamazoo River Basin Study.

Source: U.S. Census of Population, 1960, 1970



### Location Quotients

The performance of a region's export industries are important to its economic growth. Location quotients are one method for identifying the export sectors. In general, the quotient compares the region's percentage share of an activity with its percentage share of the national economy. Export industries have a quotient value greater than 1.0.

Location quotients for total employment are presented in Appendix B for each county. It is noted that employment data includes only those persons on wages and salaries covered by Social Security.

Each county, with the exception of Calhoun, Jackson, and Kalamazoo have location quotients greater than 1.0 in farm employment. Van Buren County has the largest figure , 6.7, followed by Allegan County, 3.2. The farm quotient for Michigan is 0.5. Kalamazoo has the largest non-farm employment location quotient of 1.1 for both 1968 and 1972. It is followed by Berrien, Calhoun, and Jackson counties with nonfarm quotients of 1.0 for both years.

Berrien County has the highest quotients of manufacturing employment, 1.7 and 1.9, for 1968 and 1972, respectively. Manufacturing quotients remained stable, or, increased over the four year period for all counties with the exception of Kalamazoo County where it dropped from 1.5 to 1.4.



## LAND USE

Land use classifications used in this study are taken from the Michigan Conservation Needs Inventory 1968 (CNI). These CNI data represent a two percent statistical sample of soil quality, rural land use, and soil conservation needs. Land is classified by its agricultural use in 1967--cropland, pasture, forest, or other. Non-agricultural land is classified as urban built-up land, federal non-cropland, and small water areas.

Major land use information for each subarea is presented in Table 6. Total land area for the hydrologic basin is over 1.87 million acres. Over 54 percent of this acreage was in cropland; 23 percent in forest; and 10 percent in pasture and other agricultural land.

CNI data, by county for both 1967 and 1958 is presented in Appendix C. This data details trends in Subregion I and II. The 10-county region consists of over 4 million acres. In 1967, over 89 percent of the land--nearly 3.6 million acres--was allocated to agricultural uses as compared to the 1958 level of over 91 percent.

The major change in land use that took place between 1967 and 1958 was a shift from agricultural use to non-agricultural uses. The additional non-agricultural land has been used primarily for urban built-up. In 1958, 306,500 acres was reportedly used for urban built-up in the 10-counties. By 1967, this had increased to nearly 390,300 acres.

Most of the additional land classified as urban built-up was previously classified as agricultural land. Both Subregions reported less agricultural land in the 1967 inventory than in 1958. Although the total amount of agricultural land decreased, cropland increased



Table 6. Land Inventory by Major Land Use, 1967. Kalamazoo River Basin Study.

				Other	Urban Built-Up	
				Agricultural Land	Small Water	Total Land
						Acres
Subarea I	299,488	19,136	85,827	28,183	99,085	531,719
Subarea II	344,143	36,975	171,465	43,675	103,982	700,240
Subarea III	170,347	18,843	67,234	12,587	20,220	289,233
Subarea IV	200,477	13,157	105,616	12,760	18,708	350,718
Hydrologic Basin (I-IV)	1,014,455	88,111	430,142	97,207	241,995	1,871,910
10-County Region	2,249,739	204,447	870,665	263,983	429,086	4,017,920

Source: Michigan Soil and Conservation Needs Inventory, 1967



7.9 percent and forest 54.4 percent. The amount of land classified as pasture contracted 34.8 percent while acreage categorized as other land<sup>1/</sup> declined 62.9 percent.

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<sup>1/</sup> Other land includes: farmsteads, farmroads, feed lots, ditch banks, fence and hedgerows and the like; rural non-farm residences, investment tracts, and coastal dunes, and marshes not used for grazing, and the like; and stripmines, borrow and gravel pits.



## FARM CHARACTERISTICS

Agriculture is relatively more important in the 10-county region than in the State of Michigan. The 10-county region accounts for only 11 percent of the State's acreage. However, it contains 19 percent of Michigan's commercial farm land. In 1969, 43.6 percent, over 750,000 acres, of the land area in the region was dedicated to commercial farming. This compares to 25.0 percent for the State. Some 25 percent of the market value of the State's agricultural products were also produced in the region. Detailed farm characteristics data are presented in Appendix D.

### Farm Population, Employment, and Farm Operator Characteristics

The 1970 Census of Population reports 62,800 persons living on farms in the 10-county region (see Table 7). This is a 37.5 percent decline from the 100,492 level of 1960. The 1970 level represents only 6.0 percent of the region's total population but 22.6 percent of Michigan farm population.

From 1960 to 1970, the decline in farm population was slightly greater in Subregion II-38.9 percent--than in Subregion I-35.2 percent. In 1960, 10.8 percent of Subregion I's population was located on farms--by 1970 this figure had declined to 6.3 percent; total farm population had decreased by 35.2 percent. Correspondingly, Subregion II's farm population dropped from 11.2 percent to 5.8 percent of the total population; during the 10-year period, the regional farm population contracted 38.9 percent.

In 1970, 13,555 persons were employed in agriculture, forestry, and fisheries in the region (see Table 8). This employment represents only 3.4 percent of total regional employment but 24.3 percent of the



Table 7. Farm Population, 1960, 1970. Kalamazoo River Basin Study

					Farm Pop. as % of total	Farm Pop. as % of Michigan Farm Population		
	Total Population	Farm Population						
	1970	1960	1970	1960	1970	1960	1970	1960
----- in percentages -----								
Subregion I	391,300	355,278	24,794	38,261	6.3	10.8	8.9	8.7
Subregion II	654,520	556,158	38,006	62,232	5.8	11.2	13.7	14.2
10-County Region	1,045,820	911,436	62,800	100,493	6.0	11.0	22.6	22.9
Michigan	8,875,083	7,823,194	277,529	438,099	3.1	5.6	---	---

Source: U.S. Census of Population, 1960, 1970.



Table 8. Agriculture, forestry, and fisheries employment,  
1960, 1970. Kalamazoo River Basin Study.

			Agricul. Forestry	
			and Fisheries	
	<u>Total Employment</u>			
	1970	1960	1970	1960
Subregion I	147,541	128,001	4,043	7,176
Subregion II	247,576	202,364	9,512	14,699
10-County Region	395,117	330,365	13,555	21,875
Michigan	3,252,830	2,740,425	58,707	93,663

Source: U.S. Census of Population, 1960, 1970.



State's employment in this sector. Of note is that agricultural employment dropped 38.0 percent in the region between 1960 and 1970.

The Census Agriculture presents data for all farms<sup>1/</sup> and for commercial farms.<sup>2/</sup> Of the 18,424 farms in the 10-county region in 1969, 53.6 percent were classified as commercial. These 9,876 farms produced 95.8 percent of the agricultural products sold in the region. Since the commercial farms are the agriculturally productive units of the area, but represent little more than half the total number of farms in the region, data will be presented for both farm types.

In 1969, there were 18,424 farm operators in the 10-county region. The Census classified 77.5 percent of the farm operators in the 10-county area as full owners. This contrasts to only 65.7 percent full ownership for commercial farms (see Tables 8 and 9). Over 95 percent of both the commercial and all farm operators owned at least part of the land they farmed in 1969. This is comparable to the 1959 level of 94 percent.

Approximately two out of three farm operators in the region supplemented their incomes by working off the farm, at least part-time, in 1969. In 1969, 54.5 percent of the farm operators reported working off-the-farm 100 days or more. The percentage of commercial farm

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1/ Farm is defined as places of less than 10 acres if the sales of the agricultural products normally amounted to at least \$250; or places of 10 acres or more if the sales of agricultural products for the year normally amounted to at least \$50.

2/ Commercial farm is generally defined as: farms with sales of agricultural products for the year normally amounted to at least \$2,500.



Table 9. Commercial Farm Operators - Ownership, 1959, 1964, 1969. Kalamazoo River Basin Study.

	Commercial Farms				Full Owners				Part Owners				Tenants							
	1969		1964		1969		1964 <sup>1/</sup>		1969		1964		1959		1969		1964		1959	
	1969	1959	1964	1959	1969	1959	1964	1959	1969	1959	1964	1959	1969	1959	1964	1959	1969	1959	1964	1959
----- percent -----																				
Subregion I	3,503	4,455	5,399	63.9	55.7	52.8	30.6	36.0	36.5	36.0	36.5	36.5	5.5	7.8	10.2	5.5	7.8	10.2		
Subregion II	6,373	7,376	8,801	66.6	64.1	65.9	29.0	30.0	27.2	4.4	4.4	4.4	5.1	5.1	5.9	5.1	5.1	5.9		
10-County Region	9,876	11,831	14,200	65.7	61.0	60.9	29.5	32.3	30.7	4.8	4.8	4.8	6.1	6.1	7.6	6.1	6.1	7.6		
Michigan	44,175	53,956	65,042	59.8	55.5	57.5	34.0	36.6	33.2	6.2	6.2	6.2	7.3	7.3	8.8	7.3	7.3	8.8		

1/ Percentiles for 1964 and 1959 do not total 100% since a management classification was used during those census years.

Source: U.S. Census of Agriculture, 1959, 1964, 1969.



Table 10. All Farm Operators - Ownership, 1959, 1964, 1969. Kalamazoo River Basin Study.

	All Farms				Full Owners				Part Owners				Tenants			
	1969		1964		1969		1964		1969		1964		1969		1964	
	1959		1959		1959		1959		1959		1959		1959		1959	
----- percent -----																
Subregion I	7,112	7,872	8,974	77.6	69.4	68.2	17.9	24.0	25.4	4.5	6.3	8.1				
Subregion II	11,312	13,060	16,046	77.5	74.8	75.4	18.6	20.5	19.3	3.9	4.1	4.9				
10-County Region	18,424	20,932	25,020	77.5	72.8	72.8	18.4	21.8	21.5	4.1	5.0	6.1				
Michigan	77,946	93,304	111,765	72.2	68.4	69.2	22.4	25.2	23.5	5.4	6.0	7.0				

1/ Percentiles for 1964 and 1959 may not total 100 percent since a management classification was used during those census years.

Source: U.S. Census of Agriculture 1969, 1964, 1959.



operators working at non-farm jobs was significantly lower--only 52.6 percent of the commercial operators worked off the farm in 1969. However, the percentage working at other jobs has steadily increased since 1959 when only 44.8 percent of the commercial operators were employed off the farm (see Appendix D).

#### General Farm Characteristics.

Information pertaining to numbers of farms, farm size, value of land and buildings, and economic class of farms are presented in this section. An analysis of these data provides some understanding into the nature of agricultural investment structure within the study area.

In 1969, there were 18,424 farms in the 10-county area with an average size of 128 acres. This compares to 153 acres for all farms in Michigan. Ten years earlier there were 6,596 more farms; they averaged 11 acres smaller in size. Average farm size varies between subregions. In Subregion I the average size farm was 153 acres in 1969 while in Subregion II it was only 113 acres.

Some 9,880 farms of the 18,424 identified in the 1969 Census of Agriculture were classified as commercial farms.<sup>1/</sup> While the percentage of commercial farms in Subregion I dropped to 49.3 percent of all farms in 1969 from 56.6 percent in 1964; the percentage was stable in Subregion II at 56.3 and 56.5 percent of all farms in 1969 and 1964,

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<sup>1/</sup> For the purposes of this study commercial farms will be defined as farms with sales of agricultural products amounting, or normally amounting, to \$2,500 (this includes Classes I-V). Commercial farms are broken into five classes based on the market value of all agricultural products sold: Class I, \$40,000 or more; Class II, \$20,000 - \$39,999; Class III, \$10,000 - \$19,999; Class IV, \$9,999; and Class V, \$2,500 - \$4,900.



respectively. The State percentage declined slightly from 57.7 percent to 56.6 percent over the same period.

Between 1959 and 1969 a larger percentage of the commercial farms in Subregion II were categorized in Classes I-III than in Subregion I. In 1969, 12.1 percent of the commercial farms in Subregion II were in Class I while only 8.6% of the Subregion I commercial farms were in this group. Of the commercial farms in Subregion II, one-half had sales over \$10,000 in 1969; only two-fifths of the commercial farms in Subregion I had sales at that level.

#### Farm Income and Sales.

Farm sales and related income for all farms in the region totaled ~~\$2.2~~<sup>217</sup> million in 1969. The sale of agricultural products (crops including nursery products and hay; forest products; and livestock, poultry and their products) provided 94.2 percent of the total; 4.5 percent came from government farm programs; 0.1 percent came from recreational services; and 1.2 percent came from income derived from farms with farm related income from customwork and other agricultural services

The 10-counties generated one quarter of Michigan farm sales and income.

In 1964 and 1959, the market value of all agricultural products sold in the 10-counties was nearly evenly split between crops (including nursery, forest, and hay products) and livestock, poultry, and their products

In 1969, the portion of the sales derived from crops dropped to under 39 percent. The State of Michigan also experienced a decline, however, not as substantial.



Livestock and poultry production is emphasized more heavily in Subregion I than Subregion II. While livestock production ranged from 63 to 71 percent of the agricultural products sold in Subregion I between 1959 and 1969--Subregion II's livestock and poultry sales represented only 43 to 57 percent of the total agricultural sales during the 10 year period.



## AGRICULTURAL PRODUCTION

Between 1959 and 1969, total farmland in the 10-county region declined from 2,810,500 to 2,363,200 acres. Simultaneously, the harvested cropland contracted over 27 percent.<sup>1/</sup> The decrease in cropland was more pronounced in Subregion I--31 percent, than in Subregion II--25 percent.

A larger percentage of Subregion I's cropland is allocated to the production of grains, soybeans, and hay than in Subregion II. While only 78 percent of Subregion II cropland was used for corn, sorghum, hay, soybeans, wheat, and other small grains in 1969, 95 percent of the cropland in Subregion I was allocated to the production of these crops. While field crops are the major emphasis of Subregion I, Subregion II is a major producer of Michigan's specialty crops. Twenty-one percent of the cropland in Subregion II was allocated to Irish and sweet potatoes, vegetables, berries, and orchards in 1969.

Livestock and poultry production is emphasized more heavily in Subregion I than Subregion II. While livestock production ranged from 63 to 71 percent of the agricultural products sold in Subregion I between 1959 and 1969--Subregion II's livestock and poultry sales represented only 43 to 57 percent of the total agricultural sales during the 10 year period. 1969 livestock and poultry sales are summarized in Table 14, comparative data is not available for earlier years. Detailed agricultural data for the 10-county region is presented in Appendix E.

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1/ See Tables 10, 11, and 12.



Table 11. All Farms, 10-County Region - Acres of Harvested Cropland by Crops as a Percentage of Total Harvested Cropland 1959, 1964, and 1969. Kalamazoo River Basin Study.

	Harvested Cropland			Harvested Cropland as Portion of total		
	1969	1964	1959	1969	1964	1959
-Acres in 1,000's-						
Corn, grain silage	317.9	395.4	461.9	30.5	30.3	32.0
Sorghum, grain silage	61.6	69.7	51.2	5.9	5.3	3.6
Wheat	0.9	0.1	NA	0.1	-	NA
Other small grains	1.1	0.1	NA	0.1	-	NA
Soybeans	115.1	189.6	223.9	11.0	14.5	15.5
Hay	95.6	141.8	NA	9.2	10.9	NA
Irish and Sweet Potatoes	57.5	35.2	19.2	5.5	2.7	1.3
Vegetables	241.3	306.8	311.3	23.1	23.5	21.6
Berries	4.3	4.6	5.1	0.4	0.4	0.4
Orchards	27.8	28.6	32.7	2.7	2.2	2.3
Total harvested cropland	1043.6	1303.5	1442.3			

Source: U. S. Agricultural Census 1959, 1964, 1969.



Table 12. All Farms, Subregion I - Acres of Harvested Cropland by Crops as a Percentage of Total Harvested Cropland 1959, 1964, and 1969. Kalamazoo River Basin Study.

	Harvested Cropland			Harvested Cropland as Portion of total		
	1969	1964	1959	1969	1964	1959
-Acres in 1,000's-						
Corn, grain	146.7	201.5	236.9	32.1	33.5	35.9
silage	31.7	32.4	24.8	6.9	5.4	3.8
Sorghum, grain	0.3	-	NA	0.1	-	NA
silage	0.4	-	NA	0.1	-	NA
Wheat	60.6	95.2	119.9	13.3	15.8	17.0
Other small grains	46.1	66.9	NA	10.1	11.1	NA
Soybeans	33.8	20.8	8.2	7.4	3.5	1.2
Hay	118.8	150.5	155.1	24.5	25.1	23.5
Irish and Sweet Potatoes	1.3	1.7	2.0	0.3	0.3	0.3
Vegetables	4.3	6.1	5.9	0.9	1.0	0.9
Berries	0.2	0.1	0.2	-	-	-
Orchards	2.5	3.1	3.6	0.5	0.5	0.5
Total harvested cropland	457.1	600.8	659.4			

Source: U. S. Agricultural Census 1959, 1964, 1969.



Table 13: All Farms, Subregion III - Acres of Harvested Cropland by Crops as a Percentage of Total Harvested Cropland 1959, 1964, 1969. Kalamazoo River Basin Study.

	Harvested Cropland			Harvested Cropland as Portion of total		
	1969	1964	1959	1969	1964	1959
-Acres in 1,000's-						
Corn, grain	171.2	193.9	225.0	29.2	27.6	28.7
silage	30.0	37.3	26.4	5.1	5.3	3.4
Sorghum, grain	0.6	-	NA	0.1	-	NA
silage	0.6	-	NA	0.1	-	NA
Wheat	54.4	94.4	112.0	9.3	13.4	14.3
Other small grains	49.5	74.8	NA	8.4	10.6	NA
Soybeans	23.6	14.3	11.1	4.0	2.0	1.4
Hay	129.6	156.3	156.2	22.1	22.2	19.9
Irish and Sweet Potatoes	3.0	2.9	3.1	0.5	0.4	0.4
Vegetables	23.5	22.4	26.8	4.0	3.2	3.4
Berries	12.1	14.3	14.6	2.1	2.0	1.9
Orchards	82.1	85.3	84.3	14.0	12.1	10.8
Total harvested cropland	586.5	702.7	782.9			

Source: U. S. Agricultural Census 1959, 1964, 1969.



Table 14. Value of Livestock and Poultry Sales on Commercial Farms by Subregions -- 1969 Kalamazoo River Basin Study.

	Livestock	Poultry & their products sold	Dairy products	Other cattle & calves	Hogs, sheep, goats	Other livestock & products
----- Dollars in Thousands -----						
Subregion I	44,515.1	2,577.2	19,479.3	3,179.8	13,302.0	5,690.6
Subregion II	67,468.4	17,913.3	24,257.4	3,484.8	10,845.8	10,515.3
10-County Total	111,983.5	20,490.5	43,736.7	6,664.6	24,147.8	16,204.9
Michigan	462,296.3	47,577.6	218,698.4	33,117.0	107,640.2	49,899.0
Region as % state	24.2	43.1	20.0	20.1	22.4	32.5
						13.8

Source: U.S. Bureau of Census, Census of Agriculture, 1969, 1964.



### Field Crop Production.

For the purposes of this study, Field crops include corn, sorghum, soybeans, hay, wheat, and other small grains. Between 1959 and 1969, the harvested cropland<sup>1/</sup> of field crops decreased 29.7 percent. The decrease in field cropland was more pronounced in Subregion I--30.7 percent, than in Subregion II--28.8 percent. As the harvested acreage declined, the average yield per acre increased; average yields for hay increased 19 percent between 1959 and 1969, yields for corn increased 49 percent. Significant gains were also made in sorghum and wheat yields. Acreages, production, and yield data for the various crops are presented in Appendix E, Tables E-1 through E-7.

Corn. Thirty-six percent of the region's cropland was used for corn production in 1969; this represented 25 percent of Michigan's harvested corn acreage. In 1969, 379,524 acres of corn were harvested in the 10-county region. Nearly 320,000 acres were harvested for grain, the remainder for corn silage. Although the acreage of corn harvested for grain decreased 31 percent between 1959 and 1969, the average yield per acre has increased from 49.1 bushels to 73.1 bushels respectively, increasing total production 13 percent.

Wheat. In 1969, 4.3 million bushels of wheat were harvested in the region. This represented over 20 percent of Michigan's total wheat production. Cropland acreage allocated to wheat declined 49 percent between 1959 and 1969. Although yields have risen, the total wheat

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<sup>1/</sup> In all future use of the word, cropland, reference is made to harvested cropland unless otherwise stated.



production for the region dropped 37 percent during that period.

Oats. In 1969, 16 percent of Michigan's oats were harvested in commercial farms in the 10-county region. Approximately 66,200 commercial farm acres were allocated to its production. Although the average yield per acre rose by more than one-third between 1969 and 1959, the acreage harvested dropped by over 50 percent, this resulted in a net loss of oat production over the time period.

Hay. In 1969, 23 percent of the region's harvested cropland was in hay production; the 605,000 tons comprised 19 percent of Michigan's hay production. Over the previous ten years, cropland allocated to hay production decreased 22 percent in the region. Most of the hay produced was alfalfa or alfalfa mixtures. In 1969, approximately 75 percent of the commercial hay acreage (over 190,000 acres) was devoted to alfalfa production.

Soybeans. Soybeans are a minor crop in the region. Less than 57,500 acres of cropland or 5.5 percent of total cropland produced soybeans. Although present acreage devoted to soybeans is minimal, acreage increased nearly 200 percent between 1959 and 1969.

#### Specialty Crops.

Allegan, Berrien, Kalamazoo, Ottawa, and Van Buren counties produce a large percentage of Michigan's specialty crops. In 1973, Van Buren County ranked first in the State in grape acreage, Berrien County was first in prune, plum, pear, and strawberry acreage. Berrien and Van Buren counties ranked second and third respectively in apple acreage in 1973. Acreages, production, and yield data for the specialty



fruits grown in the five counties are presented in Appendix E, Table E-8.

Grape Production. A total of 1,389 Michigan grape growers supported 16,878 acres of grape vines in 1973. Of the total acreage, about 99 percent was located in southwestern Michigan.

Van Buren County was the leading grape county in 1973 with 8,149 acres of vines reported, or 48 percent of the State total, Berrien County followed with 43 percent. Nearly 97 percent of Michigan's grape acreage was located in Allegan, Berrien, Kalamazoo, and Van Buren Counties. The average size of operation at the State level was 12.2 acres of grapes per grower for the State. However, three-fourths of the growers operated less than this amount. The average grape farm in the southwestern portion of Michigan averaged 12.5 acres of grapes per grower.

Michigan grape production is presented in Appendix E. The figures presented are quite indicative of conditions in the four counties--Allegan, Berrien, Kalamazoo, and Van Buren.

Grape yields are highly variable and influenced by weather conditions. For example, in 1971, the grape crop yielded 4.34 tons per acre. This contrasts to the 1968 average yield of 1.43 tons per acre.

In 1972, 9 percent of the grapes sold were used for wine production, 5 percent were sold fresh, and 86 percent were processed for juice and other products.

Prune and Plum. Some 1,390 prune and plum growers reported 8,283 acres of prune and plum trees in 1973. Of the total acreage,



two-fifths was located in Ottawa, Allegan, Berrien, Kalamazoo, and Van Buren counties. In 1973, Berrien County was the leader with 1,837 acres of trees. In 1973, the average prune and plum operation in Michigan was 5.9 acres per grower. However, approximately 73 percent of the growers were smaller than this level.

Between 1967 and 1972 the average yield varied from 3.2 tons to 1.6 tons per acre.

Tart Cherries. In 1973, 2,252 Michigan tart cherry growers reported 41,233 acres of cherry trees. Of the State acreage, one-fourth was located in Allegan, Berrien, Kalamazoo, Ottawa, and Van Buren Counties. Berrien and Van Buren Counties accounted for 12, and 9 percent, respectively, of the total. The average size of operation at the State level in 1973 was 18.3 acres of tart cherries per grower. This compares to only 11.8 acres in the five basin counties.

Pears. In 1973, 1,304 Michigan pear growers reported 10,906 acres of pear trees. Of the total acreage, 61 percent was located in Ottawa, Allegan, Berrien, Kalamazoo, and Van Buren Counties. Berrien County was the leader with 3,066 acres of trees or about 28 percent of Michigan's total. Allegan and Van Buren Counties represented 16 and 15 percent of the State total, respectively. The major variety was Bartlett. The average Michigan operation in 1973 was 8.2 acres of pears. The five counties averaged 9.8 acres, an average considerably influenced by Allegan County's 24 acres average per grower.

Apples. Over 66,100 acres of apple trees were reported by 2,384 Michigan growers in 1973. Of the total acreage, approximately 39 percent were located in Allegan, Berrien, Kalamazoo, Ottawa, and Van



Buren counties. Berrien county ranked second in apple trees acreage statewide with about 16 percent of the total. Van Buren County was second with about 12 percent. Approximately 92 percent of the apple acreage in the five counties was of the standard type tree, and 8 percent in the dwarf and semi-dwarf types. The average operation at the State level and also in the five counties was 27.8 acres of trees. However, approximately, two-thirds of the total growers operated less than this amount. The average value of production of apples between 1967 and 1972 was over \$26,500,000, which accounted for the largest production value of any fruits harvested in Michigan during that time period.

Vegetables and Berries.

Allegan, Berrien, Kalamazoo, Ottawa, and Van Buren counties accounted for 21 percent of Michigan's total vegetable and berry sales in 1969. These 5 counties had over 8 million dollars in vegetable sales, with \$3.5 million and \$2.4 million being sold in Berrien and Van Buren Counties, respectively. Production data for specialty vegetables grown in the five counties is presented in Appendix E, Table E-8.

Berrien and Van Buren Counties were ranked first and second respectively in cantaloupe acreage statewide in 1969 accounting for over one-third of Michigan's production. Berrien and Van Buren Counties also accounted for 41 percent of the tomato acreage. The two counties also produced 80 percent of the State's raspberries in 1969.

Cucumber. In 1969, Allegan, Berrien, Ottawa, and Van Buren Counties accounted for approximately 20 percent of the State cucumber acreage. 4,350 acres of cropland was allocated to cucumber production



in these 4 counties.

Asparagus. In 1969, 6,580 acres of asparagus were grown in Allegan, Berrien, Kalamazoo, Ottawa, and Van Buren Counties. This represented nearly 55 percent of Michigan's total asparagus acreage. Statewide, Van Buren County was the leading asparagus county with 4,000 acres or one-third of the total state acreage.

Strawberries. A total of 446 Michigan strawberry growers reported 3,611 acres of strawberries in 1973. Of the total acreage reported, 52.9 percent were located in Allegan, Berrien, Kalamazoo, Ottawa, and Van Buren. Berrien county was the leading strawberry county with 1,026 acres of strawberries reported or 28 percent of the Michigan total; Van Buren was second with approximately 23 percent.

Strawberry acreage has decreased one-third statewide between 1969 and 1972 from 6,000 to 4,000 acres. Yield has varied from a high of 5,800 pounds to a low of 4,400 pounds per acre.

Blueberries. Van Buren, Ottawa, Allegan, and Berrien Counties provided for the first, second, third, and fourth largest blueberry acreages, respectively, in 1969. Eighty-six percent of the Michigan blueberry acreage was located in these counties. Blueberry acreage has steadily increased statewide since 1954. In 1969, over 7,500 acres were allocated to blueberries and more than 30.3 million pounds of berries were harvested in Michigan.

#### Livestock and Poultry Production.

In 1969, over \$115 million of livestock, poultry, and their products were sold in the 10-county region. This represented 24 percent of the livestock and poultry sold in Michigan. The region sold over 43 percent



of the State's poultry and poultry products, and over 32 percent of the hogs, sheep, and goats. In 1969, sales of livestock and livestock products made up over 60 percent of all farm sales. Appendix E, Tables E-11 and E-12, summarize livestock and poultry production in the 10-county region.

Cattle and Calves. Over 155,000 head of cattle and calves were sold in the 10-counties in 1969 at a value of over 30.8 million dollars. This number of cattle sold represents over 20 percent of all cattle sold in Michigan. The number of cattle sold in 1969 was 8 percent less than in 1964. This compares to a statewide sales drop of over 16 percent during that period. Cattle sales accounted for 37 percent of the livestock and livestock product (including poultry) sales in Subregion I, while accounting for only 21 percent of the total sales in Subregion II.

Dairy Cattle and Dairy Products. Twenty-seven percent of the region's cattle and calf, inventory was dairy cattle in 1969. The sale of dairy cattle amounted to over \$6.6 million or 6 percent of the region's livestock sales in 1969. Over \$43.7 million of dairy products were sold accounting for over 39 percent of the livestock sales in the region that year. The region produced over 20 percent of Michigan's dairy cattle and products in 1969.

A larger percentage of Subregion I's resources were allocated to dairy cattle and products than in Subregion II. While dairy cattle and dairy product sales accounted for 41 percent of livestock sales in Subregion II in 1969, dairy sales represented 51 percent of the Subregion I sales.



Hogs and Pigs. Over 381,000 head of hogs and pigs were reported sold in the region in 1969. This number represents over 34 percent of all hogs sold in Michigan. The number of hogs and pigs on farms in the region total over 227,000 head. The hog and pig inventory and sales increased within the 10-county region between 1964 and 1969 although the State inventory and sales have decreased. Hog production occurs in both Subregions. However, the largest proportion--67 percent--is located in Subregion II.

Sheep and Lambs. The Census reported 48,127 sheep and lambs being marketed in the 10-county area in 1969. This represented 24.4 percent of the sheep and lambs sold in Michigan. The number of sheep sold in the 10-county region and the State fell about 19 percent between 1964 and 1969. Over 70 percent of the region's sheep inventory is located in Subregion I. While the Subregion I inventory declined 20 percent between 1964 and 1969, the inventory contracted only 39 percent in Subregion II.

Poultry. The Census reported 2.7 million chickens 3 months or older on farms in the 10-county region. During the year over 600,000 chickens were sold as broilers or other meat-type chickens. This is nearly 40 percent below the 1964 level. The region accounted for 86.4 and 67.9 percent of Michigan broiler sales in 1969 and 1964, respectively.

Over one million turkeys were sold in the 10-county region in 1969. This represented a 7.0 percent increase over the 1964 level. Nearly all of the basin's poultry is raised in Subregion II.

Fertilizer Use.

Thirty-seven percent of the commercial land in farms had fertilizer



applied to increase crop and pasture production in 1969. Almost 112,000 tons of either dry or liquid fertilizer was applied to nearly 650,000 acres in the 10-counties in 1969. The average application rate was 321 and 363 pounds per acre for Subregions I and II respectively.

Table 15. Commercial Fertilizer Use, 1969. Kalamazoo River Basin Study

	Commercial	Land in	Farms	Commercial Fertilizer Use
	--Acres--	--Acres--		--Tons--
Subregion I	786,413	272,566		43,744
Calhoun	213,501	76,185		12,108
Eaton	192,193	68,171		11,037
Hillsdale	199,964	70,920		10,965
Jackson	180,755	57,290		9,634
Subregion II	963,639	374,909		68,042
Allegan	203,193	82,512		15,237
Barry	142,089	42,191		6,375
Berrien	171,736	81,368		15,950
Kalamazoo	138,851	51,410		7,759
Ottawa	136,950	51,652		9,289
Van Buren	170,820	65,776		13,432
10-County Total	1,750,052	647,475		111,786

Source: U. S. Census of Agriculture 1969.

Irrigated and Drained Land.

Because rainfall is adequate for most types of crop production in the 10-county region, only small acreages are irrigated. The 1969 Census of Agriculture reported 20,403 acres irrigated on commercial farms. Supplemental irrigation is an established land-use water practice in Michigan. Over half (54 percent) of the total land irrigated is located in Southwestern Michigan. Of the 10 leading counties in irrigated acreage, 4 (Van Buren, Berrien, Ottawa, and Allegan) are located in the Study Area. Nearly one-third of the acres irrigated is in truck crops;



24 percent is in berries, and 13 percent in flowers, nurseries or sod in the 4-county area. Table 17 presents data on acres irrigated by crop in 1970.

Approximately 310,000 acres of commercial farmland was drained. This represented 17.7 percent of the region farm acreage, the largest amount of acreage drained was in Eaton County (Subregion I) where over 70,000 acres or 36.4 percent of the commercial farm land was affected.



Table 16. Commercial Farms - Irrigated and Drained Cropland. 1969.  
Kalamazoo River Basin Study.

	: Land in Farms	: Irrigated Land	: Drained Land
	: - acres -	: - acres -	: - acres -
Subregion I	: 786,413	1,703	164,506
Calhoun	: 213,501	903	25,971
Eaton	: 192,193	246	70,052
Hillsdale	: 199,964	88	53,850
Jackson	: 180,755	466	14,633
	:		
Subregion II	: 963,639	18,700	145,227
Allegan	: 203,193	2,524	36,364
Barry	: 142,089	423	22,197
Berrien	: 171,736	4,590	26,980
Kalamazoo	: 138,851	425	7,229
Ottawa	: 136,950	3,072	28,613
Van Buren	: 170,820	7,666	23,844
	:		
10-County Total	: 1,750,052	20,403	309,733
	:		

Source: U. S. Census of Agriculture 1969.

Table 17. Total Acres Irrigated, by Crop, in 1970. Kalamazoo River Basin Study.

Crop	: 4 Counties	: 6 Counties	: 10 Counties
	----- Acres -----		
Flowers, nurseries, sod	: 3,480	604	4,084
Berries	: 6,312	53	6,365
Other Fruits	: 2,666	46	2,712
Potatoes	: 996	413	1,409
Truck Crops	: 8,524	1,253	9,777
Field Crops	: 2,254	725	2,979
Other	: 2,130	2,126	4,256
Total	: 26,362	5,220	31,582

Source: Irrigation in Michigan 1970. Water Resources Commission, Michigan Department of Natural Resources, November, 1970. Lansing, Michigan.



## APPENDIX A



Table A-1. Urban, Rural-Farm and Rural Non-Farm Population by Counties - 1950, 1960, 1970. Kalamazoo River Basin Study.

County	Total			Urban			Rural Farm			Rural Non-Farm		
	1970	1960	1950	1970	1960	1950	1970	1960	1950	1970	1960	1950
Allegan	66,575	57,729	47,493	15,014	14,726	11,558	9,319	12,585	19,624	42,242	30,423	16,311
Barry	38,166	31,738	26,183	6,501	6,375	6,096	6,608	6,887	10,871	25,057	18,472	9,216
Berrien	163,875	149,865	115,702	76,012	74,279	58,182	10,368	14,688	21,531	77,180	60,995	35,989
Calhoun	141,963	138,858	120,813	84,577	90,103	82,181	10,679	9,165	13,941	46,706	39,575	24,691
Eaton	68,892	49,684	40,023	28,988	19,302	15,112	9,011	10,434	13,244	30,652	19,973	11,667
Hillsdale	37,171	34,742	31,916	7,728	7,629	7,297	7,478	10,214	13,228	21,965	16,919	11,391
Jackson	143,274	131,994	107,925	78,572	76,023	61,325	9,222	8,448	12,711	55,388	47,518	33,889
Kalamazoo	201,550	169,712	126,707	152,083	119,179	83,332	6,767	6,958	11,372	42,742	43,616	32,003
Ottawa	128,181	98,719	73,751	61,921	45,685	31,216	11,300	10,662	16,867	54,707	42,449	25,668
Van Buren	56,173	48,395	39,184	12,139	9,119	5,629	8,284	10,453	16,485	35,758	28,843	17,070
10-County Total	1,045,820	911,436	729,697	523,535	462,420	361,928	89,036	100,494	149,874	432,397	348,783	217,895



Table A-2. Population Change, Natural Increase, and Net Migration. 1950-1960, 1960-1970. Kalamazoo River Basin Study.

Counties	1960-1970						1950-1960					
	Total Population			Natural Increase			Net Migration			Total		
	1970	1960	1950	1970	1960	1950	1970	1960	1950	1970	1960	1950
Allegan	66,575	57,729	47,493	6,941	1,905	8,846	8,083	2,153	10,236			
Barry	38,166	31,738	26,183	3,381	3,047	6,428	3,548	2,007	5,555			
Berrien	163,875	149,865	115,702	20,754	-6,744	14,010	23,499	10,664	34,163			
Calhoun	141,963	138,858	120,813	16,297	-13,192	3,105	17,046	999	18,045			
Eaton	68,892	49,684	40,023	6,688	12,520	19,208	6,751	2,910	9,661			
Hillsdale	37,171	34,742	31,916	1,560	869	2,429	3,768	-942	2,826			
Jackson	143,274	131,994	107,925	14,976	-3,696	11,280	17,840	6,229	24,069			
Kalamazoo	201,550	169,712	126,707	22,843	8,995	31,838	25,023	17,982	43,005			
Ottawa	128,181	98,719	73,751	15,937	13,525	29,462	16,336	8,632	24,968			
Van Buren	56,173	48,395	39,184	4,487	3,291	7,778	4,723	4,488	9,211			
10-County Region	1,045,820	911,436	729,697	113,864	20,520	134,384	126,617	55,122	181,739			

Source: U. S. Census of Population 1950, 1960, 1970.



## APPENDIX B



Table B-1. Civilian Labor Force by Subregions, 1960-1970. Kalamazoo River Basin Study

	Civilian Labor Force <sup>3/</sup>	Employment	Number Unemployed	Number
	1970	1960	1970	1960
----- number -----				
Subregion I <sup>1/</sup>	155,732	135,049	147,541	128,001
Subregion II <sup>2/</sup>	261,011	212,068	247,576	202,364
10-County Region	416,743	347,117	395,117	330,365
Michigan	3,455,346	2,930,348	3,252,830	2,726,864

1/ Subregion I includes Eaton, Calhoun, Jackson, and Hillsdale Counties

2/ Subregion II includes Allegan, Barry, Berrien, Kalamazoo, Ottawa, and Van Buren Counties

3/ Labor force was defined in 1960 as persons 14 years or older, whereas the 1970 definition includes only persons 16 years or older.

Source: U.S. Census of Population 1960, 1970.  
Growth Patterns in Employment by County 1960-1950.



Table B-2. 10-County Civilian Labor Force 1960-1970. Kalamazoo River Basin Study.

	Civilian Labor	Force	1/	1960	1970	Number Employed	1960	1970	Number Unemployed	1970	1960
Allegan	25,432		20,887		23,978		19,923		5.7		4.6
Barry	14,483		11,970		13,748		11,375		5.1		5.0
Berrien	66,769		59,663		63,308		56,446		5.2		5.5
Calhoun	58,415		54,385		55,338		51,802		5.3		6.1
Eaton	27,330		18,930		26,269		18,075		3.9		4.7
Hillsdale	14,659		12,819		13,725		12,280		6.4		4.2
Jackson	55,328		48,915		52,209		45,844		5.6		6.4
Kalamazoo	82,997		65,393		79,098		62,818		4.7		4.1
Ottawa	50,183		35,942		47,514		34,615		5.5		3.8
Van Buren	21,147		18,213		19,930		17,187		5.8		5.7
10-County Total	416,743		347,117		395,117		330,365		5.2		4.8
Michigan	3,455,346		2,930,348		3,252,830		2,726,864		5.9		6.9

1/ Labor force was defined in 1960 as persons 14 years or older, whereas the 1970 definition includes only persons 16 years or older.

Source: U.S. Census of Population 1970.

Growth Patterns in Employment by County 1950-1960.



Table B-3. 10-County Labor Force<sup>1/</sup> by Sectors 1970. Kalamazoo River Basin Study.

	Total Employed	Agriculture Forestry Fisheries	Manu- facturing	Commun. utilities	Transp. ret. trade	Whls. ret.	Services	Mining & Construc.
Allegan Co. % of total	23,978	1,708 7.1	9,972 41.6	911 3.8	4,163 17.4	5,531 23.1	1,693 7.1	
Barry Co. % of total	13,748	757 5.5	6,156 44.8	538 3.9	1,982 14.4	3,542 25.8	773 5.6	
Berrien Co. % of total	63,308	2,230 3.5	27,367 43.2	2,672 4.2	11,269 17.8	16,520 26.1	3,250 5.1	
Calhoun Co. % of total	55,338	1,080 2.0	19,904 36.0	2,781 5.0	9,949 18.0	19,361 35.0	2,263 4.1	
Eaton Co. % of total	26,269	899 3.4	9,020 34.3	1,007 3.8	4,740 18.0	8,808 33.5	1,795 6.8	
Hillsdale Co. % of total	13,725	1,000 7.3	5,078 37.0	610 4.4	2,548 18.6	3,734 27.2	755 5.5	
Jackson Co. % of total	52,209	1,064 2.0	18,650 35.7	4,059 7.8	10,151 19.4	15,417 29.5	2,868 5.5	
Kalamazoo Co. % of total	79,098	1,445 1.8	26,393 33.4	3,056 3.9	15,579 19.7	29,050 36.7	3,575 4.5	
Ottawa Co. % of total	47,514	1,833 3.9	18,293 38.5	2,469 5.2	9,168 19.3	12,682 26.7	3,069 6.5	
Van Buren Co. % of total	19,930	1,539 7.7	8,008 40.2	865 4.3	3,294 16.5	4,794 24.1	1,430 7.2	



Table B-3 (Cont'd.)

		Agriculture	Transp.	Whls.		
		Forestry	Commun.	ret.		
		Fisheries	utilities	trade	Services	Mining & Construc.
10-County total	395,117	13,555	148,841	18,968	72,843	119,439
% of total		3.4	37.7	4.8	18.4	21,471 30.2 5.4
Michigan	3,252,830	58,707	1,168,540	170,308	632,596	1,053,162
% of total		1.8	35.9	5.2	19.4	169,517 32.5 5.2

1/ Labor Force includes persons 16 years or older.

\* percentages for counties may not total to exactly 100% due to the rounding of numbers.

Source: Census of Population 1970, Table 123



Table B-4. 10-County Labor Force<sup>1</sup> by Sectors 1960. Kalamazoo River Basin Study.

		Agriculture	Transp.	Whls.			Mining & Construc.
		Forestry	Commun.	ret.	Services	trade	
		Fisheries	facturing	utilities			
Allegan Co.	19,923	2,456	7,902	754	3,187	4,348	1,276
% of total		12.3	39.7	3.8	16.0	21.8	6.4
Barry Co.	11,375	1,389	4,531	432	1,575	2,798	650
% of total		12.2	39.8	3.8	13.8	24.6	5.7
Berrien Co.	56,446	4,164	23,877	2,793	9,389	13,445	2,778
% of total		7.4	42.3	4.9	16.6	23.8	4.9
Calhoun Co.	51,802	1,868	18,591	2,811	8,519	17,737	2,276
% of total		3.6	35.9	5.4	16.4	34.2	4.4
Eaton Co.	18,075	1,759	6,064	877	3,033	5,186	1,156
% of total		9.7	33.5	4.9	16.8	28.7	6.4
Hillsdale Co.	12,280	1,850	3,908	515	2,100	3,163	744
% of total		15.1	31.8	4.2	17.1	25.8	6.0
Jackson Co.	45,844	1,699	16,256	4,276	8,324	13,223	2,066
% of total		3.7	35.5	9.3	18.2	28.8	4.5
Kalamazoo Co.	62,818	1,794	24,102	2,656	10,885	19,966	3,415
% of total		2.9	38.4	4.2	17.3	31.8	5.4
Ottawa Co.	34,615	2,424	14,697	1,656	5,759	7,943	2,136
% of total		7.0	42.5	4.8	16.6	22.9	6.2
Van Buren Co.	17,187	2,472	5,846	818	2,701	4,193	1,157
% of total		14.4	34.0	4.8	15.7	24.4	6.7



Table B-4 (Cont'd.)

		Agriculture	Transp.	Whls.		
		Forestry	Commun.	ret.	Services	Mining & Construc.
		Fisheries	facturing	trade		
10-County total	330,365	21,875	125,774	17,588	55,472	92,002
% of total		6.6	38.1	5.3	16.8	27.8
Michigan	2,740,425	93,662	1,035,892	155,588	484,018	830,363
% of total		3.4	37.8	5.7	17.7	30.3
						140,902
						5.1

1/ The labor force includes all persons over 16 years of age.

\*Percentages for counties may not total to exactly 100%.

Source: Growth Patterns in Employment by County 1950-1960.



Table B-5. Total Employment Location Quotient, 1968, 1972. Kalamazoo River Basin Study.

Counties	Year	Non Farm											
		Farm	Total	Gov't.	Private Non-Farm								
					Total	Mfg.	Mining	Const.	Trans.	Comm.	Trade	FIR	Serv.
Allegan	1968	3.2	0.8	0.8	0.8	1.2	0.9	0.6	0.4	0.7	0.2	0.6	
	1972	3.2	0.8	0.9	0.8	1.3	0.9	0.6	0.4	0.7	0.2	0.6	
Barry	1968	1.5	0.8	0.9	0.8	1.3	D	0.5	0.4	0.6	0.5	0.6	
	1972	1.6	0.8	0.9	0.8	1.4	D	0.4	0.4	0.5	0.5	0.6	
Berrien	1968	2.6	1.0	0.6	1.1	1.7	D	0.6	0.6	0.8	0.5	0.8	
	1972	2.6	1.0	0.6	1.1	1.9	1.7	0.6	0.5	0.8	0.5	0.8	
Calhoun	1968	0.5	1.0	0.9	1.1	1.5	0.1	0.6	0.8	0.8	1.2	0.9	
	1972	0.5	1.0	0.9	1.1	1.6	0.2	0.6	0.8	0.8	1.2	0.9	
Eaton	1968	1.3	0.8	1.0	0.8	0.9	D	0.7	0.4	0.8	0.5	0.8	
	1972	1.3	0.8	1.1	0.8	0.9	D	0.5	0.4	1.0	0.4	0.6	
Hillsdale	1968	1.3	0.8	0.8	0.8	1.1	1.4	0.4	0.5	0.7	0.3	0.6	
	1972	1.3	0.8	0.8	0.8	1.4	1.6	0.3	0.4	0.7	0.3	0.5	
Jackson	1968	0.6	1.0	0.8	1.1	1.4	0.1	0.9	1.5	0.9	0.5	0.9	
	1972	0.6	1.0	0.9	1.1	1.4	0.2	0.9	1.5	0.9	0.5	0.9	
Kalamazoo	1968	0.3	1.1	1.0	1.1	1.5	0.1	1.1	0.6	0.9	0.6	0.9	
	1972	0.3	1.1	1.0	1.1	1.4	0.1	1.0	0.6	0.9	0.6	1.1	
Ottawa	1968	1.7	0.9	0.6	1.0	1.6	0.1	0.9	0.6	0.8	0.4	0.8	
	1972	1.6	1.0	0.6	1.0	1.8	0.1	1.0	0.7	0.8	0.4	0.8	
Van Buren	1968	6.7	0.8	0.8	0.8	1.2	D	0.8	0.3	0.6	0.3	0.5	
	1972	6.7	0.8	0.9	0.8	1.2	-	0.8	0.4	0.7	0.3	0.6	
Michigan	1968	0.5	1.0	0.8	1.1	1.4	0.5	0.9	0.8	1.0	0.8	0.9	
	1972	0.5	1.0	0.9	1.1	1.4	0.5	0.8	0.8	1.0	0.8	0.9	

Source: Regional Economics Information System; Bureau of Economic Analysis, U.S. Dept. of Commerce.



## APPENDIX C



Table C-1. 1967 and 1958 CNI Agricultural Inventory by Subregions. Kalamazoo River Basin Study.

	Total	Land	Total Inventory:	Cropland	Pasture	Forest	Other Land				
	Area	1967	1958	1967	1958	1967	1958				
----- 1,000 Acres -----											
----- 1,000 Acres -----											
Subregion I	1,652.5	1,502.3	1,517.7	984.4	939.6	164.9	304.3	189.6	129.6	223.6	
Calhoun	453.8	401.3	395.7	268.8	233.7	19.2	44.4	93.0	58.6	20.2	59.0
Eaton	362.9	339.8	342.7	244.2	229.4	20.4	41.3	50.3	42.8	24.9	29.2
Hillsdale	384.6	361.0	373.8	251.4	254.0	15.8	43.0	64.8	34.4	29.0	42.4
Jackson	451.2	400.2	405.5	219.9	222.5	28.7	36.2	96.2	53.8	55.4	93.0
Subregion II	2,365.4	2,086.5	2,155.5	1,265.3	1,144.5	120.4	148.5	566.4	374.2	134.4	488.3
Allegan	530.6	497.5	501.3	300.2	246.2	28.0	37.7	147.2	110.7	22.1	106.7
Barry	351.4	330.1	334.2	166.1	160.1	32.4	33.6	96.7	66.3	34.9	74.2
Berrien	371.2	306.3	313.0	212.8	200.5	7.8	17.5	64.6	39.8	21.1	55.2
Kalamazoo	362.9	297.7	313.2	193.0	175.1	8.7	16.4	73.1	35.7	22.9	85.0
Ottawa	361.0	286.9	326.9	168.0	168.7	18.7	27.5	84.2	68.4	16.1	62.3
Van Buren	388.5	368.0	367.9	225.2	193.9	24.7	15.8	100.7	53.3	17.4	104.9
10-County Region:4,017.9	3,588.8	3,673.2	2,249.7	2,084.1	204.4	313.4	870.7	563.8	264.0	711.9	



Table C-2. 1967 and 1958 CNI Non-Inventory Acreage by Subregions. Kalamazoo River Basin Study.

	Federal		Non-Cropland		Urban and Built-up		Small Water Area		Total Non-Inventory	
	1967	1958	1967	1958	1967	1958	1967	1958	1967	1958
----- 1,000 Acres -----										
----- 1,000 Acres -----										
Subregion I										
Calhoun	1.3	1.3	137.4	130.5	11.5	3.8	150.2	135.6		
Eaton	1.2	1.2	49.2	56.0	2.2	1.2	52.5	58.4		
Hillsdale	0	0	21.8	19.9	1.3	.9	23.1	20.8		
Jackson	.1	.1	47.2	44.0	3.7	1.5	51.0	45.6		
Subregion II										
Allegan	16.0	20.5	252.9	176.0	10.0	14.2	278.9	210.7		
Barry	.2	0	31.5	28.2	1.4	1.2	33.0	29.4		
Berrien	0	0	18.0	13.2	3.2	4.4	21.2	17.6		
Kalamazoo	9.6	14.3	53.8	34.8	1.7	1.7	65.2	50.8		
Ottawa	6.2	6.2	67.3	26.5	.5	1.4	74.1	34.1		
Van Buren	0	0	19.5	18.3	1.0	2.3	20.5	20.6		
10-County Region	17.3	21.8	390.3	306.5	21.5	18.0	429.1	346.3		



## APPENDIX D



Table D-1. All Farms - Days of Work Off Farm, 1959, 1964, 1969. Kalamazoo River Basin Study.

	- ALL FARMS -		Days of Work Off the Farm					
			1-99 days		100 or more		Percent	
	1969	1964	1969	1964	1959	1969	1964	1959
Number								
All Farms								
Subregion I	7,112	7,872	8,974	11.1	10.9	12.1	56.8	47.1
Subregion II	11,312	13,060	16,046	11.1	9.9	11.3	53.0	45.8
10-County Region	18,424	20,932	25,020	11.1	10.3	11.6	54.5	46.3

Source: U. S. Census of Agriculture 1969, 1964, 1959.



Table D-2. Commercial Farms - Days of Work Off Farm, 1959, 1964, 1969. Kalamazoo River Basin Study.

	- ALL FARMS -		Days of Work Off the Farm						
			1-99 days		100 or more		1969	1964	1959
	1969	1964	1969	1964	1969	1964			
----- Number -----									
Commercial Farms									
Subregion I	3,503	4,455	5,399	13.9	14.8	19.2	40.7	34.2	27.2
Subregion II	6,373	7,376	8,801	12.6	12.6	16.2	38.8	32.6	27.5
10-County Region	9,876	11,831	14,200	13.1	13.4	17.4	39.5	33.2	27.4

Source: U. S. Census of Agriculture 1969, 1964, 1959.



Table D-3. All Farms - Total Numbers 1959, 1964, and 1969. Kalamazoo River Basin Study.

	1969	1964	1959	Decrease 1959-1969	Decrease 1964-1969	Decrease 1959-1964
----- in numbers -----						
Subregion I						
Calhoun	1,725	1,837	2,021	14.6	6.1	9.1
Eaton	1,782	2,126	2,393	25.5	16.2	11.2
Hillsdale	2,028	2,307	2,526	19.7	12.1	8.7
Jackson	1,577	1,602	2,034	22.5	1.6	21.2
TOTAL	7,112	7,872	8,974	20.7	9.7	12.3
Subregion II						
Allegan	2,470	2,666	3,427	27.9	7.4	22.2
Barry	1,301	1,549	1,802	27.8	16.0	14.0
Berrien	2,513	3,012	3,809	34.0	16.6	20.9
Kalamazoo	1,194	1,243	1,566	23.8	39.4	20.6
Ottawa	1,846	2,260	2,636	30.0	18.3	14.3
Van Buren	1,988	2,330	2,806	29.2	14.7	17.0
TOTAL	11,312	13,060	16,046	29.5	13.4	18.6
10-County Region	18,424	20,932	25,020	26.4	12.0	16.3
Michigan	77,946	93,504	111,817	30.3	16.6	16.4

Source: U. S. Census of Agriculture 1959, 1964, 1969.



Table D-4. All Farms - Average Size of Farm by County, 1959, 1964, 1969. Kalamazoo River Basin Study.

	All Farms			% Change		Average Size of Farms	
	1969	1964	1959	1959-69	1969	1964	1959
	Number			Acres			
<b>Subarea I</b>							
Calhoun	1,725	1,837	2,021		168	167	152
Eaton	1,782	2,126	2,393		146	140	130
Hillsdale	2,028	2,307	2,526		138	136	127
Jackson	1,577	1,602	2,034		164	167	150
<b>TOTAL</b>	7,112	7,872	8,974	-20.7	153	151	142
<b>Subarea II</b>							
Allegan	2,470	2,666	3,427		112	108	94
Barry	1,301	1,549	1,802		152	147	136
Berrien	2,513	3,012	3,809		86	79	69
Kalamazoo	1,194	1,243	1,566		155	158	142
Ottawa	1,846	2,260	2,636		96	89	241
Van Buren	1,988	2,330	2,806		113	104	68
<b>TOTAL</b>	11,312	13,060	16,046	-29.5	113	106	103
<b>Basin</b>	18,424	20,932	25,020	-26.4	128	123	117
<b>Michigan</b>	77,946	93,504	111,817	-30.3	153	145	132

Source: U. S. Census of Agriculture 1959, 1964, 1969.



Table D-5. Commercial Farms, Average Acres by County, 1959, 1964, 1969. Kalamazoo River Basin Study.

	Farms		Farms		Farms		Average Farm Size		
	1969	1964	1959	1969	1964	1959	1969	1964	1959
	Number		Acres		Acres		Acres		
<b>Subregion I</b>									
Calhoun	852	1,032	1,203	213,501	244,374	264,613	251	237	220
Eaton	888	1,241	1,431	192,193	243,708	272,101	216	196	190
Hillsdale	1,027	1,373	1,382	199,964	251,016	253,421	195	183	183
Jackson	736	809	993	180,755	197,485	233,870	248	244	236
<b>TOTAL</b>	<b>3,503</b>	<b>4,455</b>	<b>5,009</b>	<b>786,413</b>	<b>936,583</b>	<b>1,024,005</b>	<b>224</b>	<b>210</b>	<b>204</b>
<b>Subregion II</b>									
Allegan	1,414	1,544	1,725	203,193	213,166	238,206	144	130	138
Barry	664	814	857	142,089	168,060	192,555	214	206	225
Berrien	1,382	1,729	1,960	171,736	192,924	209,836	124	112	107
Kalamazoo	621	689	805	138,851	155,081	178,313	224	225	222
Ottawa	1,167	1,363	1,440	136,950	150,993	158,367	117	111	110
Van Buren	1,125	1,237	1,218	170,820	177,482	187,342	152	143	154
<b>TOTAL</b>	<b>6,373</b>	<b>7,376</b>	<b>8,005</b>	<b>963,639</b>	<b>1,057,706</b>	<b>1,164,619</b>	<b>151</b>	<b>143</b>	<b>145</b>
<b>Basin Total</b>	<b>9,876</b>	<b>11,831</b>	<b>13,014</b>	<b>1,750,052</b>	<b>1,994,289</b>	<b>2,188,624</b>	<b>177</b>	<b>169</b>	<b>168</b>

Source: U. S. Census of Agriculture 1959, 1964, 1969.



Table D-6. Average Value Per Acre by County, 1959, 1964, and 1969. Kalamazoo River Basin Study.

	All Farms			Commercial Farms		
	1969	1964	1959	1969	1964	1959
	----- dollars -----					
<b>Subregion I</b>						
Calhoun	262	207	180	255	NA	NA
Eaton	311	234	206	289		
Hillsdale	275	190	182	271		
Jackson	294	204	182	285		
<b>SUBTOTAL</b>	<b>285</b>	<b>209</b>	<b>187</b>	<b>274</b>		
<b>Subregion II</b>						
Allegan	318	240	196	323		
Barry	241	180	140	239		
Berrien	520	474	352	498		
Kalamazoo	412	286	256	388		
Ottawa	402	346	238	401		
Van Buren	367	275	251	377		
<b>TOTAL</b>	<b>351</b>	<b>298</b>	<b>215</b>	<b>372</b>		
<b>Basin Total</b>	<b>320</b>	<b>257</b>	<b>203</b>	<b>328</b>		
<b>Michigan</b>	<b>326</b>	<b>232</b>	<b>328</b>			

Source: U. S. Census of Agriculture 1959, 1964, 1969.



Table D-7. All Farms - Farm Income and Sales, 1959, 1964, and 1969. Kalamazoo River Basin Study.

		Market Value of All Ag. Products Sold		Recreational Services <sup>1</sup>		Gv't <sup>2</sup> and Other Prog. <sup>3</sup>		Custom Work		Farm Income	
		1969	1964	1969	1964	1969	1964	1969	1964	1969	1964
----- dollars in thousands -----											
Subregion I	64,138.0	60,816.0	52,880.5	48.5	158.8	4,978.6	913.4	70,078.5	60,974.8	52,880.5	
Subregion II	140,403.6	117,862.6	99,056.8	183.5	136.8	4,694.2	1,755.7	147,037.0	117,999.4	99,056.8	
10-County Region:	204,541.6	178,678.6	151,937.3	232.0	295.6	9,672.8	2,669.1	217,115.5	178,974.2	151,937.3	
Michigan	829,450.5	766,395.0	622,959.8	1,184.5	1,281.7	45,660.1	9,268.3	885,563.4	767,676.7	622,959.8	

11/ Data is not available for 1959.

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2/ Data is not available for 1964 or 1969.  
3/ Data is not comparable. 1964 and 1959 totals do not include governmental farm program income and custom work and other agricultural services totals. 1959 total does not include recreational services.

Source: U. S. Census of Agriculture 1959, 1964, 1969.



Table D-8. Market Value of All Agricultural Products Sold. 1959, 1964, and 1969. Kalamazoo River Basin Study.

		Crops, Including Nursery, Livestock Poultry & Forest, & Hay Prod. Sold : Their Products Sold as Portion of Total : as Portion of Total							
		Market Value of All Agricultural Products Sold	1969	1964	1959	1969	1964	1959	
--thousands of dollars--									
-----percent-----									
Subregion I	64,138.0	60,816.0	52,880.5	28.2	37.4	35.6	71.8	62.6	64.4
Subregion II	140,403.6	117,862.6	99,056.8	43.2	56.3	56.6	56.8	43.7	43.4
10-County Region	204,541.6	178,678.6	151,937.3	38.5	49.9	49.3	61.5	50.1	50.7
Michigan	829,450.5	766,395.0	622,959.8	41.6	47.7	46.4	58.4	52.3	53.6

Source: U. S. Census of Agriculture, 1959, 1964, 1969.



Table D-9. Farm Sales and Related Income by Subregions 1969, Kalamazoo River Basin Study.

	All Farms 1969	Commercial 1969	NonCommercial 1969
Subregion I	70,078,490	64,842,713	5,235,777
Per Farm	9,854	18,511	1,451
Subregion II	147,036,957	140,435,132	6,601,825
Per Farm	12,998	22,036	1,337
10-County Region	217,115,447	205,277,845	11,837,602
Per Farm	11,784	20,786	1,385
Michigan	885,563,474	841,752,744	43,810,730
Per Farm	11,362	19,055	1,297

Source: U. S. Census of Agriculture 1969.



## APPENDIX E



Table E-1. All Farms, 10-County Region - Field Crops Harvested, 1959, 1964, 1969. Kalamazoo River Basin Study.

	Units:	Acres		Production		Yield Per Acre	
		1969	1964	1959 :	1964	1959	1964
Corn, grain	bu	317,898	395,420	461,903	23,238,064	20,609,200	22,673,645
	silage	61,626	69,682	51,225			
Sorghum, grain	bu	860	71	NA	44,220	3,470	
	silage		1,071	52			
Wheat	bu	115,056	189,607	223,934	4,302,644	7,077,385	6,857,979
							37.4 37.3
Other small grains		95,575	141,750	NA	--	--	--
Soybeans	bu	57,493	35,156	19,242	1,237,826	701,531	404,762
Hay <sup>1/</sup>	tons	241,327	306,826	311,291	604,717	684,614	667,802
Total Field Cropland Harvested		914,630	1,167,442	1,301,860	--	--	--

1/ Excluding Sorghum Hay.

Source: U. S. Census of Agriculture 1959, 1964, 1969.



Table E-2. All Farms, Subregion I - Field Crops Harvested, 1959, 1964, 1969.  
Kalamazoo River Basin Study.



Table E-3. All Farms, Subregion II - Field Crops Harvested, 1959, 1964, 1969.  
Kalamazoo River Basin Study.

	Units:	1969	1964	1959	1969	1964	1959	1969	1964	1959
Corn, grain	bu	171,246	193,943	224,975	12,125,524	9,393,100	10,476,043	70.8	48.4	46.6
silage	bu	29,963	37,307	26,449						
Sorghum, grain	bu	594	45		30,012	2,870		50.5	63.8	
silage	bu	649	42							
Wheat	bu	54,431	94,443	112,025	2,017,835	3,468,030	3,362,510	37.1	36.7	30.0
Other small grains	bu	49,496	74,826							
Soybeans	bu	23,647	14,311	11,077	498,955	264,399	222,703	21.1	18.5	20.1
Hay	tons	129,562	156,327	156,196	318,898	333,010	322,886	2.5	2.1	2.1
Total Field Cropland Harvested	bu	465,834	577,718	654,151						



Table E-4. Corn Production 1959, 1964, 1969. Kalamazoo River Basin Study

	Acres			Production			Yield Per Acre		
	-In 1000's-			-in 1000's -			-in bushels-		
	1969	1964	1959	1969	1964	1959	1969	1964	1959
<b>Subregion I</b>									
grain	146.7	201.5	236.9	11,112.6	11,216.1	12,197.6	75.8	55.7	51.5
silage	31.6	32.4	24.8						
<b>Subregion II</b>									
grain	171.2	193.9	225.0	12,125.5	9,393.1	10,476.0	70.8	48.4	46.6
silage	30.0	37.3	26.4						
<b>Region</b>									
grain	317.9	395.4	461.9	23,238.1	20,609.2	22,673.6	73.1	52.1	49.1
silage	61.6	69.7	51.2						

Source: U. S. Census of Agriculture 1959, 1964, 1969.



Table E-5. Wheat Production, 1959, 1964, and 1969, Kalamazoo River Basin Study.

	Acres			Production			Yield Per Acre		
	-in 1,000's-			-in 1,000's -			-in bushels-		
	1969	1964	1959	1969	1964	1959	1969	1964	1959
Subregion I	60.6	95.2	111.9	2,284.8	3,609.4	3,495.5	37.7	37.9	31.2
Subregion II	54.5	94.4	112.0	2,017.8	3,468.0	3,362.5	37.1	36.7	30.0
Region Total	115.1	189.6	223.9	4,302.6	7,077.4	6,858.0	37.4	37.3	30.6

Source: U. S. Census of Agriculture 1959, 1964, 1969.



Table E-6. Oat Production - Commercial Farms, 1964, 1969. Kalamazoo River Basin Study.

	Acres		Production			Yield Per Acre		
	-in 1,000's-		-in 1,000's-			-in bushels-		
	1969	1964	1959	1969	1964	1959	1969	1964
Subregion I	34.6	54.2	72.3	1,873.2	3,071.4	3,157.6	54.2	56.6
								43.7
Subregion II	31.6	52.5	72.2	1,730.5	2,498.1	2,720.5	54.8	47.6
								37.7
Region Total	66.2	106.7	144.5	3,603.7	5,569.5	5,878.1	54.5	52.2
								40.7

Source: U. S. Census of Agriculture 1959, 1964, 1969.



Table E-7. Hay Production - All farms, 1959, 1964, 1969. Kalamazoo River Basin Study.

	Acres			Production			Yield Per Acre				
	-in 1,000's-		1959	-in 1,000's-		1964	-in tons-		1969	1964	1959
	1969	1964	1959	1969	1964	1959	1969	1964	1959	1964	1959
Subregion I	111.8	150.5	155.1	285.9	351.6	344.9	2.6	2.3	2.2		
Subregion II	129.6	156.3	156.2	318.9	333.0	322.9	2.5	2.1	2.1		
Region	241.4	306.8	311.3	604.8	684.6	667.8	2.5	2.2	2.1		

Source: U. S. Census of Agriculture 1959, 1964, 1969.



Table E-8. Soybean Production, 1959, 1964, 1969. Kalamazoo River Basin Study.

	Acres			Production			Average Yield Per Acre		
	-in 1,000's-			-in 1,000's-			1969	1964	1959
	1969	1964	1959	1969	1964	1959			
Subregion I	33.8	20.9	8.2	738.8	437.1	182.1	21.8	21.0	22.3
Subregion II	23.7	14.3	11.1	499.0	264.4	222.7	21.1	18.5	20.1
10-County Region	57.5	35.2	19.3	1237.8	701.5	404.8	21.5	20.0	21.0

Source: U. S. Census of Agriculture 1959, 1964, 1969.



pendix E. Table E-9.

FRUIT: NUMBER OF TREES, ACRES, AND PRODUCTION, 1967-1972. MICHIGAN.

FRUIT & YEAR	: Trees of		: Yield:		: 1/:Average : Price	: Value of : Production		
	: Bearing Age		: Per Acre :					
	: Acres		: Tons					
: (000)		: Tons		\$ per lb.		\$1,000		
GRAPEs <u>2/</u>	1967:	16.0	2.44	39,000	114.00	4,446		
	1968:	16.1	1.43	23,000	124.00	2,852		
	1969:	16.0	2.38	38,000	145.00	5,510		
	1970:	15.9	3.90	62,000	142.00	8,804		
	1971:	15.9	4.34	69,000	120.00	8,280		
	1972:	15.8	3.35	53,000	170.00	9,010		
	:							
PRUNES & PLUMS	1967:	5.0	3.20	16,000	97.00	1,552		
	1968:	5.7	2.46	14,000	112.00	1,568		
	1969:	6.6	2.50	16,500	84.00	1,386		
	1970:	7.2	1.60	11,500	128.00	1,472		
	1971:	7.6	2.63	20,000	72.00	1,440		
	1972:	7.9	1.77	14,000	139.00	1,946		
	:							
TART CHERRIES	1967:	40.5	1.09	44,000	360.00	15,840		
	1968:	40.0	2.50	100,000	300.00	30,000		
	1969:	40.0	2.65	106,000	152.00	16,112		
	1970:	39.5	2.00	79,000	143.00	11,297		
	1971:	39.1	2.28	89,000	198.00	17,622		
	1972:	39.1	2.74	107,000	150.00	14,868		
	:							
PEARS	1967:	9.7	2.32	22,500	139.00	3,128		
	1968:	10.1	1.19	12,000	125.00	1,500		
	1969:	10.4	2.33	24,200	69.00	1,670		
	1970:	10.6	1.60	17,000	94.00	1,598		
	1971:	10.6	1.74	18,500	80.90	1,497		
	1972:	10.5	2.14	22,500	88.90	2,000		
	:			Mil. lbs.	¢ per lb.			
APPLES, Commercial	1967:	56.5	4.91	555	5.07	28,139		
	1968:	56.0	4.96	555	5.25	29,138		
	1969:	56.0	6.03	675	3.63	24,503		
	1970:	56.0	6.16	690	3.73	25,737		
	1971:	56.5	6.19	700	3.55	24,850		
	1972:	56.6	6.18	700	3.83	26,810		
	:							

1/ Fruit production is defined as the quantity sold or utilized. Quantities no harvested for economic reasons are as follows: 1967 - none; 1968 - none; 1969 - pears, 5,800 tons; prunes and plums, 1,000 tons; tart cherries, 5,000 tons; 1970 - tart cherries, 4,000 tons; 1971 - apples, 30.0 million pounds; pears, 2,000 tons; prunes and plums, 5,000 tons; 1972 - tart cherries, 18,000 tons.

Vines of bearing age.



Table E-10. Asparagus and Strawberries: Acreage, Yield, Production and Utilization, Michigan, 1969-1972

Crop and year	Total crop				Fresh market				Processing	
	Acreage harvested	Yield per acre	Production	Value of production	Quantity of fresh	Price per cwt.	Value of fresh	Quantity of processing	Price	Price
									\$ per cwt.	\$ per Ton
<b>ASPARAGUS</b>										
1969	12,000	17	204	21.00	4,284	14	21.00	9,500	420	
1970	12,400	16	198	21.00	4,164	16	24.80	9,100	414	
1971	13,500	14	189	24.20	4,570	11	27.10	8,900	480	
1972	14,500	15	218	27.00	5,892	15	28.70	10,150	538	
<b>STRAWBERRIES</b>										
1969	6,000	5,800	34,800	21.4	7,433	19,800	23.6	15,000	18.4	
1970	5,800	4,400	25,500	20.1	5,113	15,100	22.6	10,400	16.4	
1971	5,200	4,800	25,000	20.2	5,061	13,400	23.2	9,600	15.5	
1972	4,000	5,300	21,200	24.6	5,218	13,300	28.3	7,900	18.4	

Source: Michigan Agricultural Statistics, June 1973, Michigan Department of Agriculture.



Table E-11. Livestock and Poultry Sales by Subregions - 1969 and 1964. Kalamazoo River Basin Study.

	Cattle &	Calves	Hogs & Pigs	Sheep & Lamb	Hen & Pullet <sup>1</sup>	Broilers <sup>2</sup>	
	1969	1964	1969	1964	1969	1964	1964
In Numbers							
Subregion I	74,692	76,988	126,063	154,018	34,372	35,487	257,161
Subregion II	81,094	86,927	255,602	212,896	13,755	23,982	1200,013
10-County	155,786	163,915	381,665	366,914	48,127	59,469	1457,174
Michigan	759,959	879,825	1,109,623	1,167,150	197,316	242,875	4147,687
Region as % of total	20.5	18.6	34.4	31.4	24.4	24.5	35.1
			Turkeys				
			1969	1964			
Subregion I		8,188		12,788			
Subregion II		994,783		924,308			
10-County		1002,971		937,086			
Michigan			NA		NA		
Region as % of total			-		-		
NA - Not Available							

<sup>1</sup>Hens and pullets of laying age excluding started pullets.

<sup>2</sup>Broilers and other meat type chickens less than 3 months old.

Source: U. S. Bureau of Census, Census of Agriculture, 1969 & 1964.



Table E-12. Livestock and Poultry Inventory by Subregions - 1969, 1964. Kalamazoo River Basin Study.

	Cattle & Calves	Milk Cows	Hogs and Pigs	Sheep/Lamb	Chickens <sup>1</sup>
	1969	1964	1969	1964	1964
--in 000's---					
Subregion I	140,966	153,376	35,764	50,599	78,114
Subregion II	148,694	162,293	44,472	55,168	149,130
10-Counties	289,660	315,669	80,236	105,727	227,244
Michigan	1441,556	1724,950	413,907	573,545	699,478
Basin as % of total	20.1	18.3	19.4	18.4	32.5
					30.5
					24.1
					22.4
					37.0
					33.9

1/ Chickens 3 months or older

Source: U.S. Bureau of Census, Census of Agriculture, 1969 and 1964.



